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Abstract

We use British panel data to investigate whether and to what extent individuals anticipate their retirement and adjust to it over time. We show that retirement increases satisfaction with life and the health and leisure domains of life up to three years prior to retiring. Once retired, individuals reported higher satisfaction overall and becoming more satisfied with their health, income and leisure. For health and leisure the well-being boosts did not dissipate over time, but for income satisfaction adaptation was almost complete. Our findings provide new empirical evidence on the well-being dynamics in the years leading to and following retirement.

Keywords: life satisfaction, well-being, retirement, adaptation, anticipation, BHPS

JEL codes: D03, I31, J26

1. Introduction

With a continuing increase in life expectancy, the proportion of older population in many OECD countries is rising. This demographic shift may have important implications for government spending on pensions and healthcare. In response, governments have put forward a number of policy reforms aimed at gradually raising the eligibility ages for retirement. The success of such policies may arguably depend on their effects on people's health and well-being. This paper aims to contribute to the current policy debate by investigating the dynamic effects of retirement on people's well-being, something relatively unexplored in the literature. Using long-run panel data from the British Household Panel Survey (BHPS) and its continuation, the United Kingdom Household Longitudinal Study (UKHLS), we examine whether and to what extent people anticipate their retirement and adapt to it over time.

Economists and other social scientists are becoming increasingly interested in the study of anticipation and adaptation. A growing body of literature has examined the time profile of well-being around a labor market and/or life event, including unemployment, marriage and divorce, widowhood, disability and childbirth (e.g. Clark et al., 2008; Ferrer-i-Carbonell and Van Praag, 2008; Oswald and Powdthavee, 2008; Frijters et al., 2011; Powdthavee, 2012, 2014; Clark and Georgellis, 2013; Qari, 2014). Using fixed-effects panel regressions, studies have shown that people tend to habituate to most life events, with the exception that there is only little evidence of adaptation to unemployment. Common among life events is also evidence of significant lead effects: people tend to actively anticipate most life events at least one year before their occurrence. While earlier studies provide valuable insights into the nature of the well-being profile around many life events, little continues to be known about whether the same kind of lead and lag patterns can also be found for retirement.

Most previous studies on well-being have examined the impact of retirement at time t on subjective well-being at the same point in time. Charles (2004), Johnston and Lee (2009), Latif (2011), and Horner (2014) all find that people's well-being may increase after retirement. It has also been suggested that the effect of retirement on well-being is heterogeneous and may depend on the type of retirement decision, voluntary or involuntary (Bonsang and Klein, 2012), as well as on people's personality characteristics (Kesavayuth et al., 2016).

It is a reasonable wonder how retirement may impact well-being. Kim and Moen (2001) and Wang and Hesketh (2012) offer extensive reviews. From an economic perspective, role theory suggests that work is an important part of an individual's identity, and because retirement brings work to an end, it may lead to decreased well-being. On the other hand, role theory suggests a role-strain perspective: a reduction in the number of roles following retirement may provide some relief, thereby enhancing well-being. Moreover, according to continuity theory, people are involved in many different roles during their lifetime, including those of family and friends (Atchley, 1976, 1982). Continuation of earlier lifestyle patterns and roles into retirement may help to prevent maladjustment and psychological distress. Atchley (1976) has also suggested that retirees potentially enjoy their retirement during a "honeymoon phase", a period of freedom to do things they did not have time for before retirement. With so many conflicting elements in the impact of retirement on well-being, it is an empirical question to determine the overall effect at the different stages of the retirement transition.

Surprisingly, there is little empirical study of the dynamic effects of retirement on well-being. The only previous analysis we were able to find is Zhu and He (2015). They consider adaptation in life satisfaction among Australian women and find that retirement has a positive impact on well-being. This well-being boost at the year of retirement, however, decreases with the number of years being retired. But although adaptation occurs, life satisfaction during retirement remains higher than its pre-retirement levels.

As there is but one prior study on the well-being dynamics of retirement, more remains to be understood about the nature of this phenomenon. Here, three questions suggest themselves. First, are the results found for Australian women similar to those found for another country – in our case, the UK – and thus are broadly representative? Second, given that the previous analysis was based on life satisfaction as the measure of well-being, do similar patterns hold for satisfaction with other areas of people's lives? We focus on satisfaction with three life domains – income, health and leisure – all of which may be significantly affected by retirement (e.g. Wang and Hesketh, 2012; Bonsang and Klein, 2012; Kesavayuth et al., 2016) and for which relevant measures are available both in the BHPS and the UKHLS survey. Looking at the dynamic effects of satisfaction with different areas of life (in addition to satisfaction with life overall) might be particularly useful for policy makers, who often must weight the monetary benefits of policy against the costs in terms of satisfaction.

Retirement is an (often) known event, leading to the third question addressed in the current paper: Does anticipation of retirement affect people's satisfaction? Given that retirement is generally predictable, changes in well-being may be present in the years before it actually occurs. Anticipation effects become particularly important when comparing satisfaction after an event to what existed before the event occurred. Consistent with this view, Frijters et al. (2011), Clark and Georgellis (2013) and Qari (2014) all conclude it is important to account for both anticipation and adaptation effects when studying the well-being dynamics of major life events, such as unemployment, marriage, divorce, birth of child, death of spouse or child, illness, change of residence and victim of crime.

In this study we systematically trace out both anticipation and adaptation patterns to retirement using sixteen waves of panel data from the UK. Given that selection to retirement is not random and may depend on individual characteristics, we use an instrumental variable approach to deal with endogeneity. Our instruments are based on the eligibility ages for retirement in the UK as a source of exogenous variation in retirement status, an approach successfully implemented by others (e.g. Charles, 2004; Latif, 2011; Horner, 2014; Zhu and He, 2015; Kesavayuth et al., 2016).

Our findings suggest that retirement increases satisfaction with overall life and in two domains of life – health and leisure – up to three years before it actually occurs. Once retired, individuals became significantly more satisfied with life, and with their health and leisure. These well-being boosts did not seem to dissipate over time, and individuals who had been retired for five years or more continued to report higher levels of satisfaction. Income satisfaction showed a different pattern. Like the other areas of life, there was an increase in satisfaction with income upon retirement. But we found that individuals adapted almost completely – the effect did not persist over time. These findings provide new empirical evidence on the causal link between retirement and well-being, suggesting that such link may be better understood as a three-stage process occurring before, during and after retirement.

The paper is organized as follows. Section 2 discusses our empirical model. Section 3 describes our strategy for dealing with the endogeneity of retirement. Section 4 discusses the state pension system in the UK and Section 5 presents the results. Section 6 considers a number of ways in which our analysis may be extended. Section 7 concludes the paper.

2. Anticipation and Adjustment: An Empirical Model

Let WB_{it} be subjective well-being of individual *i* at time *t*: satisfaction with overall life and domains of life – income, health, and the amount of leisure time.[1] A benchmark model, which ignores anticipation and adjustment, takes the following form

$$WB_{it} = \beta_0 + \beta_1 R_{it} + X_{it}'\beta_2 + Z_i'\beta_3 + u_i + \varepsilon_{it} \quad (1)$$

[1] As explained below in the data section, WB_{it} is measured on a 7-point scale that ranges from 1 “not satisfied at all” to 7 “completely satisfied”.

where R_{it} is the main independent variable of interest, a dummy variable that takes on the value 1 if an individual has retired at time t; X_{it} is a vector of predictor variables that vary over time; Z_i is a vector of predictor variables that do not vary over time; u_i is the person-specific error (the individuals' fixed effects); and ε_{it} is the idiosyncratic error.

To examine the dynamic effects of retirement, we augment equation (1) by including a set of dummy variables that indicate the number of years leading to (anticipating) and following (adjusting to) retirement. We concentrate on 4 years before retirement and 5 years (or more) afterwards. Our empirical approach is similar to that in Frijters et al. (2011), Powdthavee (2012), Clark and Georgellis (2013) and Qari (2014). Thus, our main empirical model can be written out as

$$WB_{it} = \delta_0 + \theta_{-4}R_{-4,it} + \theta_{-3}R_{-3,it} + \theta_{-2}R_{-2,it} + \theta_{-1}R_{-1,it} + \theta_0 R_{0,it} + \theta_1 R_{1,it} + \theta_2 R_{2,it} + \theta_3 R_{3,it} + \theta_4 R_{4,it} + \theta_5 R_{5,it} + X'_{it}\delta_1 + Z'_i\delta_2 + u_i + \varepsilon_{it} \quad (2)$$

Here adaptation is represented by a set of dummy variables, $R_{0,it}$,…,$R_{5,it}$, allowing us to distinguish between individuals with different retirement durations: 0-1 years, 1-2 years and so on up to the last group of individuals who have been retired for 5 years or more. Following earlier studies (Clark and Georgellis, 2013; Qari, 2014), this means, for example, that if a person has been a retiree for 0-1 years, then $R_{0,it}$=1 (and $R_{1,it} = 0, \dots, R_{5,it} = 0$); while $R_{2,it}$=1 (and $R_{0,it} = 0, R_{1,it} = 0, R_{3,it} = 0, \dots, R_{5,it}$ =0) if a person has retired for 2-3 years. The other lag retirement dummies are defined analogously.

Assuming retirement has an impact on well-being, if there is no adaptation then we would expect that the estimated coefficients θ_0 and θ_5 would both differ from zero but not significantly differ from each other (Clark and Georgellis, 2013). However, if there is adaptation, then θ_0 would be significantly different from θ_5 (with θ_5 smaller in magnitude). If adaptation is complete, then θ_5 would not differ from zero. People would completely adapt to the effect of retirement and we would conclude retirement has no long-term impact on that dimension of well-being. Consistent with earlier studies (Clark and Georgellis, 2013; Qari, 2014), we can quantify the degree of adaptation, the extent to which individuals adapted to the initial effect of retirement on their well-being, as $d_t = 1 - (\theta_t/\theta_0)$ for $t \in [1,5]$.

Anticipation is modelled in a similar way in equation (2). We use a set of dummy variables, $R_{-4,it}$,…,$R_{-1,it}$ to indicate whether an individual will retire in the next 3-4 years, 2-3 years, 1-2 years and 0-1 years. Thus $R_{-2,it}$=1 if a person will transition to retirement in the next 1-2 years, while $R_{-1,it}$=1 if a person will become a retiree within the next year. Lead effects of longer duration are defined in a similar manner. Moreover, we can quantify the anticipation rate in the years before entering retirement as $r_t = \theta_t/\theta_0$ for $t \in$ [-4,-1].

The omitted category for both anticipation and adaptation consists of all respondents with 4 or more years of retirement anticipation, including those who remained employed throughout the panel. Using the fixed effects estimator allows us to examine how within-person changes in retirement duration relate to within-person changes in subjective well-being in the years leading to and following retirement.

3. Dealing with Endogenous Retirement

One issue with our empirical model is that retirement is potentially endogenous (Neuman, 2008; Coe and Zamarro, 2011). There may be reverse causality between well-being and retirement, omitted variables that affect both an individual's decision to retire and his/her subjective well-being, and/or measurement error in retirement itself. Although the fixed effects estimator can address bias emanating from time-invariant unobserved heterogeneity, it does not account for the other sources of potential bias: unobserved heterogeneity that is specific to particular time-points, reverse causality, and measurement error in retirement itself.

For equation (1) we use an instrumental variable (IV) approach and appeal to the fixed effects estimator (e.g. Latif, 2011; Zhu and He, 2015; Kesavayuth et al., 2016). This approach requires that at least one valid instrument for R_{it} is available. In the first stage, we estimate the following equation

$$R_{it} = \gamma_0 + \gamma_1 Elig_{it} + X_{it}'\gamma_2 + Z_i'\gamma_3 + v_i + e_{it} \quad (3)$$

where $Elig_{it}$, the instrument for R_{it}, represents the eligibility age for state pension that is sufficiently correlated with R_{it} and orthogonal to ε_{it}. In the second stage, we estimate

$$WB_{it} = \beta_0 + \beta_1 \hat{R}_{it} + X_{it}'\beta_2 + Z_i'\beta_3 + u_i + \varepsilon_{it} \quad (4)$$

where $\hat{R}_{it}$ is the predicted retirement variable from the first-stage regression.

The instrument for R_{it} is defined as $Elig_{it} = I(Age_{it} \geq Age_t^p)$ where I is an indicator function; Age_{it} is the age of individual *i* at time *t*; and Age_t^p is the qualifying age for state pension at time *t*. Our instrument is thus a dummy variable indicating eligibility for state pension. Previous studies have used the eligibility ages for state pension as instruments for retirement, showing they are indeed strong predictors of retirement behavior (e.g. Latif, 2011; Horner, 2014; Mazzonna and Peracchi, 2014; Zhu and He, 2015).

Clearly if retirement is endogenous, leads to and lags from retirement are as well. In the more general specification where we consider leads and lags we estimate the following system of equations using fixed effects panel regressions

$$R_{-4,it} = \tau_0 + \mu_{-4}Elig_{-4,it} + \mu_{-3}Elig_{-3,it} + \mu_{-2}Elig_{-2,it} + \mu_{-1}Elig_{-1,it} + \mu_0 Elig_{0,it} + \mu_1 Elig_{1,it} + \mu_2 Elig_{2,it} + \mu_3 Elig_{3,it} + \mu_4 Elig_{4,it} + \mu_5 Elig_{5,it} + X'_{it}\tau_1 + Z'_i\tau_2 + u_{1i} + \varepsilon_{1,it}$$

…

$$R_{5,it} = \varphi_0 + \rho_{-4}Elig_{-4,it} + \rho_{-3}Elig_{-3,it} + \rho_{-2}Elig_{-2,it} + \rho_{-1}Elig_{-1,it} + \rho_0 Elig_{0,it} + \rho_1 Elig_{1,it} + \rho_2 Elig_{2,it} + \rho_3 Elig_{3,it} + \rho_4 Elig_{4,it} + \rho_5 Elig_{5,it} + X'_{it}\varphi_1 + Z'_i\varphi_2 + u_{10i} + \varepsilon_{10,it} \quad (5)$$

where we have 10 equations in this system.[2] The endogenous variables are the lead and lag effects, $R_{-4,it}, \ldots, R_{5,it}$, as shown in equation (2). The instruments are dummy variables representing the number of years before the eligibility age for stage pension ($Elig_{-4,it}, \ldots, Elig_{-1,it}$) and the number of years afterwards ($Elig_{0,it}, \ldots, Elig_{5,it}$).

The estimation of the anticipation/adjustment model is carried out in two steps. First, we estimate the series of equations given by (5) separately by fixed effects panel regressions and obtain the predicted variables $\hat{R}_{-4,it}, \ldots, \hat{R}_{5,it}$. Then we estimate equation (2) using the fixed effects estimator after replacing the leads and lags to retirement by their predicted values obtained from the first-stage regressions.[3] Correcting for the endogeneity of retirement in equation (2) produces consistent estimates for the coefficients on the lead and lag effects, θ.

4. The State Pension System in the UK

In the UK, there are 3 divisions of pensions: basic state pensions, occupational pensions and personal pensions. The State Pension is a regular payment paid by the state to its citizens when

[2] We use 16 waves of panel data, with 4 years or more of retirement anticipation and 5 years or more of retirement adaptation.

[3] We estimate the model using the fixed effects IV method. Ferrer-i-Carbonell and Frijters (2004) have shown that treating responses on Likert scales as ordinal or cardinal when used as an outcome variable does not lead to substantially different conclusions. At the same time, previous studies on well-being have highlighted the importance of controlling for fixed effects, which we do in our study.

they reach the State Pension age. Occupational pension schemes are arrangements established by employers to provide pensions to their employees. Personal pensions are defined contribution arrangements between an individual and a pension provider (such as a financial organization, bank, or insurance company).

The U.K. government has modified the country pension system continuously, allowing more financial flexibility and freedom to the pensioners. One of the interesting features of the current system relates to cash withdrawal. Individuals can choose to withdraw a lump sum from their pension savings pot when certain conditions are met.[4] The allowed withdrawal proportion or withdrawal of the whole savings pot depends on the type and size of each individual's pension fund. For example, prior to 5 April 2015, if the size of the individual's state pension fund was less than £18,000, one could withdraw the whole pot upon turning 60 years old. If individuals were aged 55 or over and could demonstrate that they had a guaranteed income in retirement of over £20,000 per year, they could take 25% of their pension savings pot as lump sum. In addition, if individuals had an occupational or personal pension scheme they could take up to two personal pension pots and an unlimited number of occupational pension pots of £2,000 each or less as lump sum. The option to withdraw part or the entire amount of one's savings pot will play an important role later in our intuition related to individual income satisfaction.

While occupational and personal pensions depend on a variety of individual characteristics, including former income and years in the workforce, eligibility for basic state pension is based on reaching certain age thresholds for males and females. As these age thresholds are determined by laws, they apply to all individuals. Hence, unlike occupational and personal pensions, eligibility for state pension is exogenous to individuals when controlling for age (Horner, 2014). This in turn suggests there is no reason to suspect that the age-specific thresholds will have any direct impact on satisfaction with life and domains of life, except through the channel of retirement decisions (Rohwedder and Willis, 2010; Zhu and He, 2015). This enables us, consistent with earlier studies (e.g. Charles, 2004; Latif, 2011; Horner, 2014; Zhu and He, 2015; Kesavayuth et al., 2016), to use the eligibility ages for state pension to construct instruments for retirement.

In the UK, men over the age of 65 and women over the age of 60 were entitled to claim state pension until 2010. Since April 2010, the women's qualifying age for state pension started

[4] The criteria and rules applied to the cash withdrawal option have been reformed in 2015. Details regarding the rules before and after the reform can be found in HM Treasury (2014).

rising, with the aim to be harmonized with that for men. Specifically, according to the Pensions Act 1995, for every one month interval, women born after 6 April 1950 and until 5 December 1953 will face an increase in their qualifying age for state pension by two months. In addition to this, according to the Pensions Act 2007, those born after 5 December 1953, both men and women, will see the eligibility age for state pension rising to 68 years of age by no later than 2046. The IV approach we use in this paper accounts for the likely changes in laws that applied to individuals over the sample period.

5. Data

Our data comes from two nationally representative surveys from the United Kingdom; the British Household Panel Survey (BHPS) and its continuation, the UK Household Longitudinal Study (UKHLS), also known as Understanding Society. The BHPS survey was carried out during the period 1991 to 2008. The respondents in BHPS were then incorporated into the second wave of the UKHLS. Out of just over 8,000 BHPS participants, almost 6,700 joined the second wave of the UKHLS, which is also referred to as BHPS wave 20.

In the BHPS, respondents are asked to evaluate how satisfied they are with their life overall. The question has been placed strategically in the questionnaire after individuals first responded to questions about satisfaction with eight different life domains. Possible responses are on a 7-point scale that ranges from 1 “not satisfied at all” to 7 “completely satisfied”. In the BHPS, the question on life satisfaction has been included from wave 6 onwards, which effectively reduces the sample period for analysis to the year 1997 onwards.[5] In the UKHLS, individuals are asked about satisfaction with only three key life domains – health, income and leisure – as well as satisfaction with life overall.

As retirement is usually accompanied by significant changes in income, health and leisure (e.g. Wang and Hesketh, 2012), we use satisfaction with these specific areas – all of which are included in both the BHPS and the UKHLS survey – as our dependent variables in studying the dynamic effects of retirement. We also use satisfaction with overall life as an additional dependent variable in order to examine the time profile of overall satisfaction in the years leading to and following retirement. Consistent with earlier studies, the overall life satisfaction distribution is skewed to the right, with a mean of about 5.378 and a standard deviation of 1.238.

[5] Wave 11 of the BHPS did not include questions on satisfaction with life and domains of life. However, it provides information on the respondents’ retirement status (see e.g. Powdthavee, 2012).

Although measures on satisfaction with life and domains of life are available from wave 6 of the BHPS onwards, we also made use of information from earlier waves of the survey (waves 1-5) regarding the respondents' employment status, ethnic group and educational attainment. Even though BHPS respondents joined the UKHLS survey in wave 2, we were able to obtain information on their job status in the previous wave, since a question was asked about previous wave job status in the second wave of the UKHLS. Therefore, we are able to track individual job status effectively from 1991 up until 2014.

An individual currently engaged in paid work or self-employed is defined as "working". Among those who reported not to be working, we use four dummy variables to distinguish the unemployed, the permanently sick or disabled, and the homemakers from those who were retired. Our definition of retirement is similar to that used in Johnston and Lee (2009), Mazzonna and Peracchi (2014), Horner (2014), and Kesavayuth et al. (2016), among others. As explained earlier, we use the gender-specific eligibility ages for retirement in the UK to construct an instrument for "retired" in equation (1). However, when we study the dynamic effects of retirement as shown in equation (2), our instruments are now a set of dummy variables indicating the number of years before reaching the gender-specific eligibility ages for retirement, and the number of years afterwards.

We focus on individuals aged 45 or older. As we model both anticipation and adaptation to retirement, we need to observe individuals transitioning from employment to retirement. Our analytical sample thus consists of all respondents who were engaged in paid work or self-employed the first time information on their satisfaction with life and domains of life became available. Some of these respondents may have retired in subsequent waves. The omitted category consists of all respondents with 4 or more years of retirement anticipation, including those who remained employed throughout the panel.

Given that individuals can generally be tracked for far shorter periods of time than the 16 waves available in the current dataset from 1997 to 2014,[6] we focus our attention on 4 years before retirement and 5 years (or more) afterwards. Application of the above selection criteria resulted in an unbalanced panel of 33,451 observations and 3,758 unique individuals (1,973 males, 1,785 females).[7] Of those observations, approximately 27.16 percent, or 9,084

[6] As questions on satisfaction with life and domains of life were not asked in wave 11 of the BHPS, our dataset consists of 12 waves of information on satisfaction from the BHPS and 4 waves from the UKHLS.

[7] We maintained the assumption of an unbalanced panel throughout the paper. Although we also tried using a balanced panel, this appears to reduce substantially the number of observations and causes weak instrument problems. This issue is not surprising: the use of a long panel required to study leads and lags to retirement makes it rather difficult to keep individuals throughout. Our approach is, nevertheless, consistent with earlier studies in this area (e.g. Powdthavee, 2012; Clark and Georgellis, 2013; Qari, 2014).

observations (4,303 men and 4,781 women), reported themselves as retired. In the retired category, there were in total 1,692 unique individuals (820 men and 872 women). Table 1 provides descriptive statistics and Table 2 shows the number of lead and lag observations for retirement.

6. Results

6.1 Preliminary Analysis

Table 3 presents some initial evidence from fixed effects micro-econometric models of satisfaction with life and domains of life using actual responses, not instruments for "retired". The dependent variables are satisfaction with life, health, income and leisure (cardinally measured on a scale of 1-7). Independent variables consist of age, age squared, and dummies for gender, employment status, education, marital status, health, ethnic group, region, wave, and real household income, number of own children living in the household, and unemployment rate by region. The estimates reported in Column 1 of Table 3 suggest that retirement enters the life satisfaction regression equation in a positive and statistically significant manner (at p-values < 0.01). We also find that retirement is associated positively with leisure and health satisfaction, while it is associated negatively with income satisfaction. Although the estimated effects on income and leisure satisfaction are significant at p-values < 0.01, the effect on health satisfaction appears to be imprecisely estimated.

Up until now the analysis assumes that individuals are neither able to anticipate their upcoming retirement, nor do they adapt to their new status after transitioning to retirement. To examine the dynamic effects of retirement, we expand equation (1) by allowing for a set of appropriate dummy variables representing the lead and lag effects to retirement.[8] The estimates of equation (2) are shown in Table 4 if we do not control for the endogeneity of retirement. Accounting for lead and lag effects to retirement leaves the estimates of the other explanatory variables mostly unchanged. The lead effects suggest that people reported significantly lower satisfaction with the amount of their leisure time 2 to 4 years before entering retirement. However, they reported significantly higher satisfaction with life one year prior to retiring. At

[8] Allowing for both anticipation and adaptation effects to retirement seems particularly important in the present context. If anticipation is not accounted for, this will affect the estimated immediate effect of retirement and hence will modify the degree of adaptation. This point is made clear in Clark and Georgellis (2013) and Qari (2014). In our setting, we find, for instance, that when the dummies capturing lead effects to retirement are omitted, then the degree of adaptation in life satisfaction is inflated, while the degree of adaptation in leisure satisfaction is deflated.

that point in time, as shown in column 1 of Table 5, the estimated lead effect is as high as 72% of the effect at the year of retirement, which is also statistically significant at p-values < 0.05.

The estimates in Table 4 also show that, once retired, individuals became significantly more satisfied with life and leisure, while becoming less satisfied with their income. For overall life satisfaction the improvement in welfare from retirement seems to be immediate, with no evidence of adaptation – the degrees of adaptation (d_1 to d_5) are not significantly different from zero (Table 5).

On the other hand, Table 4 shows that leisure satisfaction, while positive both immediately after retirement and 5 years hence, does diminish – satisfaction is higher while retired, but less so the further into retirement one is. One aspect of this result is that the impact happens smoothly; there is no statistically significant difference in the year-to-year estimates from 0-1, 1-2, 2-3, 3-4 and 4-5 years of retirement, but when we compare 4-5 to 5 years or more, the difference is statistically significant with $p < 0.05$ (Table 5). Moreover, the lower impact comes after about 3 years of retirement with 17% degree of adaptation which rises to 23% after 4 years and 38% after 5 or more years. This implies that initially people seem to enjoy the increase in the amount of their free time associated with retirement, but after three years the novelty may wear off.

Income satisfaction shows a much different pattern. Column 3 of Table 4 suggests a large (and statistically identical) drop in income satisfaction in the first and second year of retirement. By year three the negative effect has disappeared at conventional significance levels. It appears again at years 4-5 (where the effect is as strong as in the first year of retirement), only to disappear again for those retired 5 or more years. This implies that people who have been retired for 5 years or more seem to have adapted to the initial drop in income satisfaction brought about by retirement by as much as 64% (Table 5).[9]

Table 6 separates the data by gender of the respondent. The estimates suggest that both genders reported lower satisfaction with the amount of their leisure time 3-4 years before retiring, although the estimated coefficient for females is only marginally significant at the 10% level. We also find that males reported significantly higher satisfaction with their income 2-3 years prior to retiring (at p-values < 0.05), while females became significantly more satisfied with overall life one year before retiring (at p-values < 0.05). Once retired, both males and

[9] We thought this pattern might indicate satisfaction stemming from the overall situation in the economy so we estimated our model adding unemployment rate by region. The results are qualitatively equivalent with or without unemployment, indicating that is not a reason for the odd pattern with income satisfaction.

females reported higher satisfaction with life and leisure but lower satisfaction with income. There is no evidence that individuals adapted to the initial increase in life satisfaction brought about by retirement (Table 7). However, males but not females appear to have adapted almost completely (approximately 72%) to the initial drop in income satisfaction. In terms of leisure satisfaction, however, we find that females but not males adapted to the initial rise in leisure satisfaction by about 40%. Overall, these findings imply that males and females seem to follow different well-being models of adaptation and anticipation to retirement.

6.2 Results Corrected for Endogeneity

We now account for the possible endogeneity of the lead and lag effects to retirement by using the IV approach outlined above. Correcting for possible endogeneity in Table 8 appears to increase the magnitude and significance of most estimates; for health satisfaction, most estimated lead and lag coefficients are now significant, while satisfaction with income is also higher at the year of retirement.[10] This implies that it is important to account for the possible endogeneity of retirement, in line with earlier studies in this area (e.g. Charles, 2004; Horner, 2014; Zhu and He, 2015; Kesavayuth et al., 2016).

Our IV estimates reported in columns 1-4 of Table 8 suggest that during the 3 years leading to retirement satisfaction with life and domains of life – health and leisure – increases. The estimated lead effects are large: for example, in terms of life, health and leisure satisfaction, the 1-year anticipation coefficients are estimated to be as high as 62%, 156% and 43% of the effect at the year of retirement, respectively (Table 9). These anticipation effects seem to come smoothly as the year-to-year estimates from 0-1, 1-2, 2-3 and 3-4 years before retirement do not differ from each other statistically (again, see Table 9).

The estimates in Table 8 also show that, once retired, individuals reported higher satisfaction with life, while also becoming more satisfied with their health (p-values < 0.05), income (p-values < 0.01) and leisure (p-values < 0.01). Moreover, these well-being boosts do not seem to dissipate quickly. The estimated lag coefficients show that individuals continued to report higher levels of satisfaction with life and domains of life 5 years or more after transitioning to retirement. The only exception is satisfaction with income: here, individuals

[10] The first-stage F statistics for the joint significance of the excluded instruments are all above the rule-of-thumb value of 10 suggested by Staiger and Stock (1997), allowing us to reject the null hypothesis of weak IVs. The first-stage F statistics in the retirement regressions for the lead effects of durations 0-1 years, 1-2 years, 2-3 years, and 3-4 years are 21.86, 25.19, 24.28, and 25.32, respectively. And for the lag effects of durations 0-1 years, 1-2 years, 2-3 years, 3-4 years, 4-5 years, and 5 or more years, the corresponding first-stage F statistics are 35.59, 32.16, 30.72, 26.71, 21.88, and 90.09, respectively.

appear to have adapted almost completely to the initial increase in satisfaction with income brought about by retirement. In fact, there is not statistical evidence that income satisfaction one year or more after retiring differs from being employed. That would indicate adaptation is complete and swift. If we use 0 instead of the estimate in Table 9, $d_i \equiv 1$ for i=[1,5]. Using the estimated coefficients, the degree of adaptation is about 72% after 5 years or more into retirement (Table 9).[11]

Overall, the results above indicate significant lead and lag effects to retirement associated with increased satisfaction with life and domains of life – health and leisure. For ease of reading, the graphical representations of these findings are presented in Figure 1. The horizontal line represents no effect of the leads and lags to retirement on satisfaction. The vertical bars around each point correspond to the 95% confidence interval.[12]

Our finding that the positive effects of retirement on satisfaction with life, health and leisure are long-lasting runs counter to the idea of hedonic adaptation; that people's well-being is only temporarily affected by life events and tends to quickly revert back to baseline levels (e.g. Lucas, 2007; Clark et al., 2008; Clark and Georgellis, 2013). The current result is generally consistent with continuity theory and the reduced role-strain hypothesis accompanying retirement (e.g. Kim and Moen, 2001), both of which imply that retirement may not necessarily lead to maladjustment and lower well-being levels. In line with the notion of hedonic adaptation, however, we also find that people adapted almost completely to the initial rise in income satisfaction brought about by retirement.

7. Robustness Checks

We examine the robustness of our results to issues related to the definition of the reference category for the lead and lag effects to retirement, non-linear effects of age, and the age group of older respondents.

The analysis to this point has assumed that the reference category for both anticipation and adaptation consists of all respondents with 4 years or more of retirement anticipation, including those who remained employed throughout the panel. We check the sensitivity of our

[11] The initial increase is income satisfaction is perhaps explained by individuals finding, upon retirement, that the lower income does not present a hardship. This initial increase in satisfaction dissipates as people move to their normal day-to-day budgeting and expenses. What might be most important in these results is the absence of any dissatisfaction, both before and after retirement. The initial increase might also be attributable to the ability to pull some retirement savings out as a lump-sum.

[12] When testing to see if these results differ across genders, unlike the previous fixed effects estimates, splitting the sample in our IV context appears to reduce the power of the analysis, which becomes evident in the form of weak instruments. Adding gender interaction terms is not an option as it doubles the number of endogenous variables.

results to the definition of the reference category by excluding from the sample respondents who were always employed, thus focusing on those who at some point in time transitioned to retirement. The estimates in Table A1 are very similar to those reported in Table 8. The lead effects continue to be positive and statistically significant at conventional levels with respect to life and domains of life – health and leisure – up to 3 years before entering retirement. Immediately after transitioning to retirement, we continue to find that people reported higher levels of satisfaction across all three domains of life – health, income and leisure – as well as satisfaction with overall life. There is still no evidence that people adapted to the increase in satisfaction with life, health and leisure brought about by retirement, while they adapted completely to the initial increase in income satisfaction.

Age enters our baseline model both through a linear and a quadratic term. A potential concern here is that the lead and lag coefficients might simply be tracing non-linearities in the relationship between retirement and well-being. To address this issue, we re-estimated our model by including additional higher-order terms of age – a cubed and a quartic term. The estimates reported in Table A2 are largely consistent with our previous IV results. The lead effects remain positive and statistically significant at conventional levels for satisfaction with overall life, health and leisure. However, the 1-year lead effect for income satisfaction is now larger in magnitude and highly significant. Once retired, we continue to find that people became significantly more satisfied across domains of life, while also reporting higher satisfaction with overall life. However, there is now only some mild evidence of adaptation in satisfaction with one's income; the lag coefficients of less than 1 year and 5 years or more are statistically different from each other, though at p-values < 0.10. There is still no evidence that individuals adapted to the initial increase in satisfaction with life, health and leisure, in line with our previous findings.

To examine further the role of the age variable in our model we carried out an additional robustness check by constraining the upper bound of relevant ages to exclude those older than 80 years of age, hypothesizing that having a relatively shorter time horizon may impart upward or downward bias in how people report their well-being.[13] The estimates, which are reported in Table A3, are qualitatively and quantitatively similar to our previous IV results, thus lending further support for our earlier findings.

[13] This check on robustness also allows us to test if our results are driven by selection bias, which would arise if dissatisfied people at older age face higher mortality rates (e.g. Koivumaa-Honkanen et al., 2000; Collins et al., 2009).

8. Conclusion

In this paper we set out to test whether and to what extent people anticipate their retirement and adapt to it over time. Drawing longitudinal data from the BHPS and the UKHLS, we use an instrumental variable approach that exploits the eligibility ages for state pension as a source of exogenous variation in retirement status.

Retirement is a predictable event. We find that retirement is accompanied by a significant increase in satisfaction with life and domains of life – health and leisure – up to three years before it actually occurs. Our findings suggest that people actively anticipate their retirement and tend to experience higher levels of satisfaction as a result. Immediately after transitioning to retirement, individuals became significantly more satisfied with life overall, while also becoming more satisfied with the health, income and leisure domains. The well-being boosts in life, health and leisure did not seem to dissipate over time. This finding is somewhat different from Zhu and He (2015) who found evidence of partial adaptation in terms of satisfaction with life among Australian women. However, Zhu and He (2015) did not allow for anticipation to retirement as we do in this paper. Our results further suggest that individuals adapted almost completely to the initial rise in income satisfaction brought about by retirement.

Overall, there is evidence of significant well-being effects in the years leading to and following retirement, suggesting two key implications, the first empirical, the second for policy. First, regressions relying solely on the retirement impact at the year of its occurrence are bound to miss out much of the anticipation and adjustment to retirement and, hence, may grossly underestimate the actual retirement impact on well-being. Put differently, the causal relationship between retirement and well-being may be better understood as a three-stage process occurring before, during and after retirement.

From a policy perspective, the finding that retirement increases satisfaction with life and domains of life – health, income and leisure – with no evidence of adaptation in health and leisure implies that raising the official retirement ages is likely to be accompanied by substantial psychological costs, at least in the UK. This idea is consistent with Zhu and He (2015) for a sample of Australian women and seems to suggest that any attempt to alleviate the current financial burden of pension systems is likely to have important consequences for people's well-being. Given there is but one prior study on the dynamic effects of retirement on well-being (Zhu and He, 2015), new research is certainly welcome to further our understanding. Future research might be to consider the role of heterogeneity regarding anticipation and adjustment to retirement, looking at possible differences in the well-being profiles across groups of individuals.

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Table 1: Summary statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Male	33451	0.5139	0.4998	0	1
Retired	33451	0.2716	0.4448	0	1
Working	33451	0.6802	0.4664	0	1
Unemployed	33451	0.0116	0.1069	0	1
Family care giver	33451	0.0143	0.1187	0	1
Disabled	33451	0.0174	0.1308	0	1
Having at least A-level qualification	33451	0.1433	0.3504	0	1
Age	33451	59.0413	7.5988	45	93
Single	33451	0.0465	0.2105	0	1
Divorced	33451	0.0825	0.2751	0	1
Widowed	33451	0.0576	0.2331	0	1
Healthy	33451	0.3737	0.4838	0	1
White ethnic group	33451	0.9630	0.1889	0	1
Real Household Income (2010 as base year, in 1000 Pound Sterling)	33451	38.5649	29.0363	0	663.66
Number of own children living in the household	33451	0.1039	0.4113	0	5
Regional unemployment rate	33451	9.4021	1.6477	5.3	14.3
Overall life satisfaction	33451	5.3777	1.2378	1	7
Health satisfaction	33451	4.9584	1.5347	1	7
Income satisfaction	33451	4.7316	1.5514	1	7
Leisure time satisfaction	33451	5.0415	1.6106	1	7

Table 2: Number of lead and lag observations for retirement

	Anticipate 3-4 years (θ_{-4})	Anticipate 2-3 years (θ_{-3})	Anticipate 1-2 years (θ_{-2})	Anticipate 1 year (θ_{-1})	Adapt less than 1 year (θ_{0})	Adapt 1-2 years (θ_{+1})	Adapt 2-3 years (θ_{+2})	Adapt 3-4 years (θ_{+3})	Adapt 4-5 years (θ_{+4})	Adapt 5 years or more (θ_{+5})
Males	468	530	561	563	716	504	445	381	341	1,916
Females	490	554	582	584	753	533	500	415	361	2,219
Total	958	1,084	1,143	1,147	1,469	1,037	945	796	702	4,135

Table 3: Fixed effect estimates of retirement on satisfaction with life and different domains of life

	Full Sample			
	(1)	(2)	(3)	(4)
	Overall	Health	Income	Leisure
Retired	0.0855***	0.00536	-0.175***	0.821***
	(0.0260)	(0.0298)	(0.0316)	(0.0375)
Age	-0.00277	0.0332	0.00609	0.0826**
	(0.0319)	(0.0351)	(0.0366)	(0.0403)
Age squared / 100	-0.0523***	-0.0431**	0.00189	-0.148***
	(0.0164)	(0.0189)	(0.0198)	(0.0220)
Unemployed	-0.245***	-0.0576	-0.901***	0.469***
	(0.0691)	(0.0752)	(0.0863)	(0.0919)
Family care giver	-0.0209	-0.126*	-0.216***	0.487***
	(0.0607)	(0.0713)	(0.0768)	(0.0885)
Disabled	-0.500***	-0.916***	-0.671***	0.522***
	(0.0784)	(0.0822)	(0.0854)	(0.102)
Healthy	0.159***	0.442***	0.0833***	0.126***
	(0.0184)	(0.0220)	(0.0214)	(0.0238)
Real Household Income	-0.000148	-0.000478	0.00352***	-0.00226***
(2010 as base year, in 1000 Pound Sterling)	(0.000351)	(0.000374)	(0.000454)	(0.000444)
White ethnic group	-0.0784	-0.0678	-0.0923	0.0145
	(0.0633)	(0.0707)	(0.0884)	(0.0795)
Single	-0.0960	-0.0691	-0.0126	0.0648
	(0.197)	(0.173)	(0.190)	(0.231)
Divorced	-0.212***	-0.138**	-0.186***	0.0717
	(0.0705)	(0.0704)	(0.0722)	(0.0812)
Widowed	-0.351***	-0.190***	-0.0757	0.0283
	(0.0719)	(0.0733)	(0.0804)	(0.0937)
Having at least A-level qualification	0.183*	-0.0361	0.210	-0.0762
	(0.101)	(0.125)	(0.141)	(0.146)
Number of own children living in the household	0.00236	0.0000278	-0.0820**	-0.122***
	(0.0312)	(0.0346)	(0.0373)	(0.0349)
Unemployment rate by region	0.0299*	0.0181	0.0373*	-0.0371*
	(0.0167)	(0.0203)	(0.0216)	(0.0220)

Location dummies	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes
Constant	6.558***	4.503***	4.090***	4.577***
	(1.444)	(1.523)	(1.573)	(1.726)
Observations	33451	33451	33451	33451

Note: ***<1%; **<5%; *<10%. Robust standard errors are in parentheses.

Table 4: Fixed effect estimates of retirement anticipation and adaptation

	Full Sample			
	(1)	(2)	(3)	(4)
	Overall	Health	Income	Leisure
Anticipate 3-4 years	0.00123	-0.0303	0.0617	-0.134***
	(0.0297)	(0.0379)	(0.0385)	(0.0422)
Anticipate 2-3 years	-0.00838	0.0384	0.0652*	-0.0983**
	(0.0313)	(0.0379)	(0.0380)	(0.0420)
Anticipate 1-2 years	0.00963	-0.0429	-0.00711	-0.0199
	(0.0344)	(0.0415)	(0.0417)	(0.0465)
Anticipate 1 year	0.0828**	-0.0329	0.0553	0.0651
	(0.0359)	(0.0441)	(0.0432)	(0.0474)
Adapt less than 1 year	0.115***	-0.0649	-0.212***	0.883***
	(0.0365)	(0.0416)	(0.0428)	(0.0485)
Adapt 1-2 years	0.105**	-0.00209	-0.158***	0.876***
	(0.0419)	(0.0492)	(0.0495)	(0.0542)
Adapt 2-3 years	0.122***	0.0339	-0.0499	0.816***
	(0.0430)	(0.0529)	(0.0523)	(0.0572)
Adapt 3-4 years	0.0983**	-0.00407	-0.107*	0.730***
	(0.0490)	(0.0564)	(0.0571)	(0.0624)
Adapt 4-5 years	0.0483	0.0364	-0.201***	0.682***
	(0.0514)	(0.0615)	(0.0626)	(0.0694)
Adapt 5 years or more	0.0788*	0.0830	-0.0753	0.548***
	(0.0466)	(0.0552)	(0.0582)	(0.0628)
Constant	6.790***	3.862**	3.677**	6.330***
	(1.456)	(1.544)	(1.588)	(1.754)
Observations	33451	33451	33451	33451

Note: ***<1%; **<5%; *<10%. Robust standard errors are in parentheses. The controls are age; age squared/100; real household income; number of own children living in the household; unemployment rate by region; and dummies indicating: gender, job status (whether the individual is unemployed, family care giver or disabled), educational attainment, health condition, ethnic group, marital status, locations and time.

Table 5: Rate of anticipation, degree of adaptation and comparison of the coefficients (Non-IV)

Full Sample	Overall		Health		Income		Leisure	
	coefficient	S.E.	coefficient	S.E.	coefficient	S.E.	coefficient	S.E.
Anticipation and Adaptation Rate and Degree								
r_{-4}	0.0107	0.2580	0.4663	0.5880	-0.2911	0.2063	-0.152***	0.0508
r_{-3}	-0.0731	0.2825	-0.5919	0.7918	-0.3074	0.2118	-0.1113**	0.0501
r_{-2}	0.0840	0.2911	0.6604	0.6149	0.0335	0.1939	-0.0225	0.0531
r_{-1}	0.7222**	0.2886	0.5070	0.6024	-0.2607	0.2344	0.0737	0.0519
d_1	0.0815	0.3356	0.9678	0.7481	0.2554	0.1966	0.0079	0.0524
d_2	-0.0647	0.3686	1.5230	1.0052	0.7646***	0.2245	0.0758	0.0534
d_3	0.1427	0.3914	0.9372	0.8536	0.4966**	0.2388	0.1739***	0.0599
d_4	0.5787	0.4131	1.5616	1.1385	0.0538	0.2676	0.2280***	0.0686
d_5	0.3129	0.3583	2.2790	1.4310	0.6448***	0.2444	0.3797***	0.0595
Comparison of the coefficients								
Anti_3to4 - Anti_2to3	0.0096	0.0346	-0.0687	0.0431	-0.0035	0.04150	-0.03607	0.0454
Anti_2to3 - Anti_1to2	-0.0180	0.0372	0.0813*	0.0451	0.0723*	0.04034	-0.0784*	0.0459
Anti_1to2 -Anti_0to1	-0.0732**	0.0369	-0.0100	0.0442	-0.0624	0.0424	-0.0850*	0.0468
Anti_0to1-Adap_0to1	-0.0318	0.0373	0.0320	0.0444	0.2673***	0.0432	-0.818***	0.0494
Adap_0to1 - Adap_1to2	0.0093	0.0395	-0.0628	0.0470	-0.0542	0.0443	0.0069	0.0464
Adap_1to2 - Adap_2to3	-0.0168	0.0403	-0.0360	0.0522	-0.1080**	0.0480	0.0600	0.0505
Adap_2to3 - Adap_3to4	0.0238	0.0443	0.0380	0.0567	0.0568	0.0511	0.0866	0.0533
Adap_3to4 - Adap_4to5	0.0500	0.0465	-0.0405	0.0592	0.0940*	0.0557	0.0478	0.0603
Adap_4to5 - Adap_more5	-0.0305	0.0444	-0.0466	0.0511	-0.1253**	0.0514	0.1339**	0.0572

Note:

r_{-4}: _b[Anti_3to4]/_b[Adap_0to1]

r_{-3}: _b[Anti_2to3]/_b[Adap_0to1]

r_{-2}: _b[Anti_1to2]/_b[Adap_0to1]

r_{-1}: _b[Anti_0to1]/_b[Adap_0to1]

d_1: 1 - _b[Adap_1to2]/ _b[Adap_0to1]

d_2: 1 - _b[Adap_2to3]/ _b[Adap_0to1]

d_3: 1 - _b[Adap_3to4]/ _b[Adap_0to1]

d_4: 1 - _b[Adap_4to5]/ _b[Adap_0to1]

d_5: 1 - _b[Adap_more5]/ _b[Adap_0to1]

Table 6: Fixed effect estimates of retirement anticipation and adaptation by gender

	Males				Females			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Overall	Health	Income	Leisure	Overall	Health	Income	Leisure
Anticipate 3-4 years	-0.00291	-0.0347	0.0377	-0.158***	0.00799	-0.0268	0.0876*	-0.108*
	(0.0413)	(0.0559)	(0.0567)	(0.0594)	(0.0426)	(0.0518)	(0.0522)	(0.0596)
Anticipate 2-3 years	-0.0275	0.0706	0.114**	-0.0949	0.0106	0.00383	0.0211	-0.0966
	(0.0424)	(0.0526)	(0.0515)	(0.0583)	(0.0459)	(0.0545)	(0.0553)	(0.0599)
Anticipate 1-2 years	0.00127	-0.0026	0.0506	-0.0459	0.0193	-0.0883	-0.0626	0.0123
	(0.0469)	(0.0582)	(0.0573)	(0.0647)	(0.0505)	(0.0597)	(0.0604)	(0.0662)
Anticipate 1 year	0.0659	0.0276	0.0537	0.101	0.101**	-0.0940	0.0561	0.0380
	(0.0503)	(0.0618)	(0.0617)	(0.0691)	(0.0512)	(0.0630)	(0.0607)	(0.0651)
Adapt less than 1 year	0.0867*	-0.0393	-0.269***	0.914***	0.136***	-0.102*	-0.164***	0.856***
	(0.0516)	(0.0587)	(0.0597)	(0.0673)	(0.0522)	(0.0592)	(0.0613)	(0.0694)
Adapt 1-2 years	0.0958	0.0520	-0.207***	0.914***	0.115*	-0.0640	-0.116	0.850***
	(0.0594)	(0.0706)	(0.0697)	(0.0747)	(0.0596)	(0.0691)	(0.0706)	(0.0783)
Adapt 2-3 years	0.143**	0.0914	-0.0446	0.886***	0.103*	-0.0353	-0.0571	0.764***
	(0.0612)	(0.0766)	(0.0767)	(0.0837)	(0.0602)	(0.0736)	(0.0720)	(0.0776)
Adapt 3-4 years	0.147**	0.0605	-0.0541	0.818***	0.0525	-0.0849	-0.158**	0.660***
	(0.0664)	(0.0824)	(0.0825)	(0.0888)	(0.0716)	(0.0777)	(0.0799)	(0.0876)
Adapt 4-5 years	0.104	0.195**	-0.136	0.799***	-0.00562	-0.129	-0.271***	0.586***
	(0.0690)	(0.0822)	(0.0827)	(0.0994)	(0.0759)	(0.0912)	(0.0933)	(0.0966)
Adapt 5 years or more	0.0552	0.199**	-0.0764	0.617***	0.0949	-0.0284	-0.0768	0.511***
	(0.0623)	(0.0785)	(0.0814)	(0.0919)	(0.0693)	(0.0778)	(0.0827)	(0.0865)
Constant	4.848**	0.612	3.879	4.943**	8.084***	6.250***	2.321	7.532***
	(1.883)	(2.194)	(2.358)	(2.438)	(2.096)	(2.111)	(2.180)	(2.618)
Observations	17190	17190	17190	17190	16261	16261	16261	16261

Note: ***<1%; **<5%; *<10%. Robust standard errors are in parentheses. The controls are age; age squared/100; real household income; number of own children living in the household; unemployment rate by region; and dummies indicating: gender, job status (whether the individual is unemployed, family care giver or disabled), educational attainment, health condition, ethnic group, marital status, locations and time.

Table 7: Degree of adaptation by gender

Males	Overall		Health		Income		Leisure	
	coefficient	S.E.	coefficient	S.E.	coefficient	S.E.	coefficient	S.E.
d_1	-0.1053	0.6588	2.3258	3.2857	0.2308	0.2185	-0.0005	0.0688
d_2	-0.6523	0.8819	3.3295	4.6511	0.8343***	0.2691	0.0302	0.0765
d_3	-0.6998	0.9271	2.5413	3.6767	0.7987***	0.2892	0.1050	0.0801
d_4	-0.2027	0.8166	5.9715	8.5007	0.4945*	0.2738	0.1252	0.0943
d_5	0.3638	0.6208	6.0650	8.6916	0.7160***	0.2759	0.3249	0.0829

Females	Overall		Health		Income		Leisure	
	coefficient	S.E.	coefficient	S.E.	coefficient	S.E.	coefficient	S.E.
d_1	0.1526	0.3980	0.3711	0.6108	0.2914	0.3616	0.0069	0.0792
d_2	0.2420	0.4022	0.6534	0.6590	0.6511*	0.3787	0.1075	0.0747
d_3	0.6142	0.4823	0.1659	0.7053	0.0340	0.4391	0.2290***	0.0887
d_4	1.0413*	0.5639	-0.2641	0.9081	-0.6532	0.6197	0.3156***	0.0990
d_5	0.3032	0.4524	0.7212	0.7013	0.5310	0.4353	0.4026**	0.0858

Note:

d_1: 1 - _b[Adap_1to2]/ _b[Adap_0to1]

d_2: 1 - _b[Adap_2to3]/ _b[Adap_0to1]

d_3: 1 - _b[Adap_3to4]/ _b[Adap_0to1]

d_4: 1 - _b[Adap_4to5]/ _b[Adap_0to1]

d_5: 1 - _b[Adap_more5]/ _b[Adap_0to1]

Table 8: Fixed effect IV estimates of retirement anticipation and adaptation

	Full Sample			
	(1)	(2)	(3)	(4)
	Overall	Health	Income	Leisure
Anticipate 3-4 years	-0.0200	0.117	-0.317	0.493
	(0.317)	(0.359)	(0.376)	(0.412)
Anticipate 2-3 years	0.503**	0.542*	0.274	0.679**
	(0.254)	(0.292)	(0.298)	(0.324)
Anticipate 1-2 years	0.557***	0.675**	0.0890	0.880***
	(0.208)	(0.264)	(0.255)	(0.280)
Anticipate 1 year	0.559***	0.811***	0.499*	0.982***
	(0.210)	(0.258)	(0.264)	(0.278)
Adapt less than 1 year	0.898***	0.521**	0.932***	2.268***
	(0.182)	(0.221)	(0.223)	(0.243)
Adapt 1-2 years	0.867***	0.614**	0.235	2.366***
	(0.217)	(0.257)	(0.258)	(0.280)
Adapt 2-3 years	0.565**	0.512*	0.0812	1.771***
	(0.248)	(0.291)	(0.291)	(0.324)
Adapt 3-4 years	0.933***	0.637**	0.367	1.817***
	(0.261)	(0.306)	(0.298)	(0.338)
Adapt 4-5 years	0.521*	0.867***	0.349	2.155***
	(0.286)	(0.321)	(0.319)	(0.357)
Adapt 5 years or more	0.719***	0.897***	0.259	1.892***
	(0.236)	(0.275)	(0.272)	(0.310)
Observations	30294	30294	30294	30294

Note: ***<1%; **<5%; *<10%. Robust standard errors are in parentheses. The controls are age; age squared/100; real household income; number of own children living in the household; unemployment rate by region; and dummies indicating: gender, job status (whether the individual is unemployed, family care giver or disabled), educational attainment, health condition, ethnic group, marital status, locations and time.

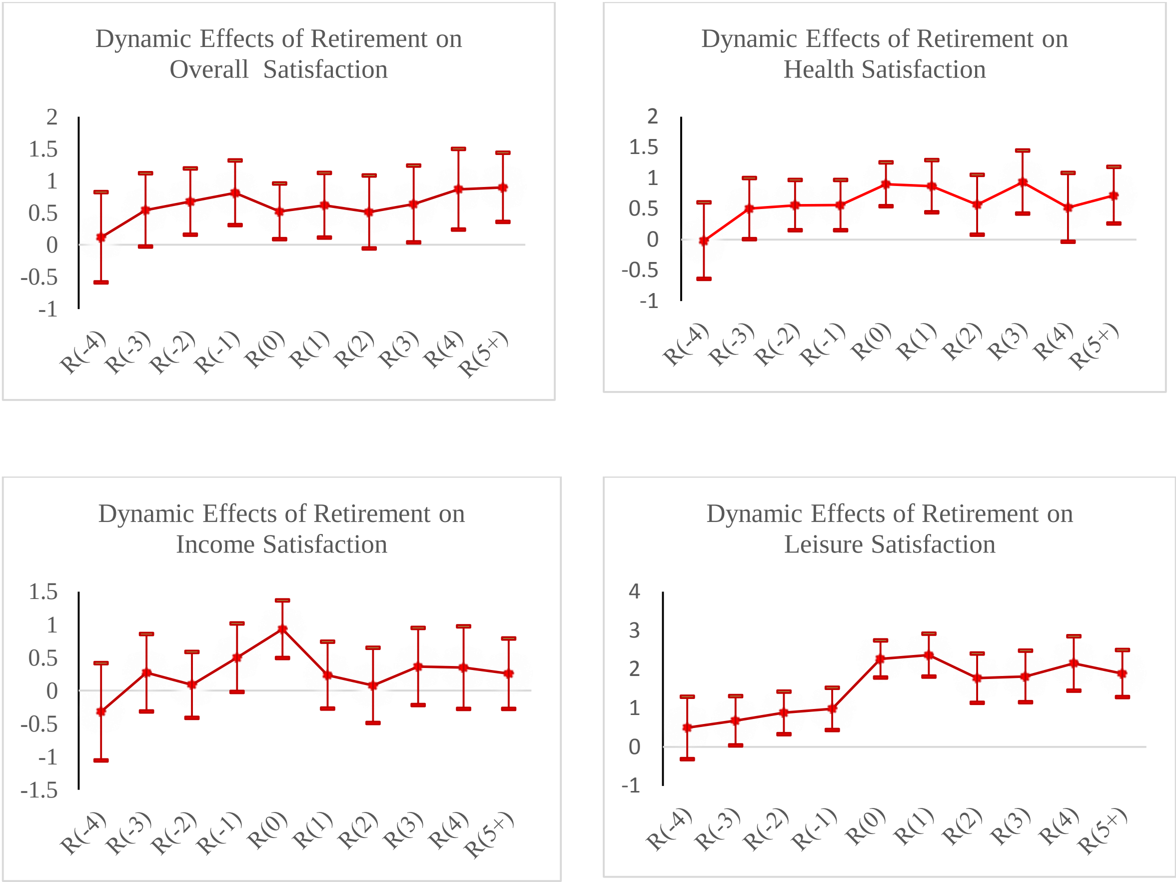
Table 9: Rate of anticipation, degree of adaptation and comparison of the coefficients (IV)

Full Sample	Overall		Health		Income		Leisure	
	coefficient	S.E.	coefficient	S.E.	coefficient	S.E.	coefficient	S.E.
<u>Anticipation and Adaptation Rate and Degree</u>								
r_{-4}	0.0223	0.3553	0.2238	0.6574	-0.3407	0.4427	0.2172	0.1735
r_{-3}	0.5604**	0.2684	1.0415*	0.5875	0.2940	0.3053	0.2996**	0.1360
r_{-2}	0.6207***	0.2417	1.2963*	0.6786	0.0956	0.2708	0.3881***	0.1228
r_{-1}	0.6227***	0.2319	1.5570**	0.7169	0.5352*	0.2817	0.4328***	0.1182
d_1	0.0349	0.3055	-0.1801	0.6931	0.7478***	0.2830	-0.0432	0.1626
d_2	0.3703	0.2637	0.0173	0.5792	0.9129***	0.3059	0.2193	0.1393
d_3	-0.0394	0.2889	-0.2238	0.6257	0.6059**	0.2982	0.1988	0.1414
d_4	0.4194	0.2997	-0.6657	0.7510	0.6257*	0.3210	0.0500	0.1526
d_5	0.1991	0.2220	-0.7236	0.6320	0.7225***	0.2625	0.1658	0.1159
<u>Comparison of the coefficients</u>								
Anti_3to4 - Anti_2to3	-0.5232	0.4284	-0.4258	0.4838	-0.5913	0.5061	-0.1868	0.5520
Anti_2to3 - Anti_1to2	-0.0542	0.3290	-0.1327	0.3943	0.1849	0.3936	-0.2009	0.4275
Anti_1to2 -Anti_0to1	-0.0017	0.2829	-0.1357	0.3611	-0.4096	0.3582	-0.10141	0.3810
Anti_0to1-Adap_0to1	-0.3388	0.2355	0.2900	0.2933	-0.4330	0.3019	-1.2864***	0.3135
Adap_0to1 - Adap_1to2	0.0313	0.2783	-0.0938	0.3341	0.6967**	0.3392	-0.0980	0.3620
Adap_1to2 - Adap_2to3	0.3012	0.3320	0.1028	0.3924	0.1538	0.3943	0.5955	0.4276
Adap_2to3 - Adap_3to4	-0.3678	0.3476	-0.1255	0.4081	-0.2860	0.3996	-0.0465	0.4478
Adap_3to4 - Adap_4to5	0.4119	0.3988	-0.2301	0.4497	0.0184	0.4402	-0.3375	0.4964
Adap_4to5 - Adap_more5	-0.1978	0.2971	-0.0301	0.3284	0.0902	0.3265	0.2626	0.3640

Note:

r_{-4}:	_b[Anti_3to4]/_b[Adap_0to1]	d_1:	1 - _b[Adap_1to2]/ _b[Adap_0to1]
r_{-3}:	_b[Anti_2to3]/_b[Adap_0to1]	d_2:	1 - _b[Adap_2to3]/ _b[Adap_0to1]
r_{-2}:	_b[Anti_1to2]/_b[Adap_0to1]	d_3:	1 - _b[Adap_3to4]/ _b[Adap_0to1]
r_{-1}:	_b[Anti_0to1]/_b[Adap_0to1]	d_4:	1 - _b[Adap_4to5]/ _b[Adap_0to1]

Figure 1:



Dynamic Effects of Retirement on Overall Satisfaction
2
1.5
1
0.5
0
-0.5
-1
R(-4) R(-3) R(-2) R(-1) R(0) R(1) R(2) R(3) R(4) R(5+)
Dynamic Effects of Retirement on Health Satisfaction
2
1.5
1
0.5
0
-0.5
-1
R(-4) R(-3) R(-2) R(-1) R(0) R(1) R(2) R(3) R(4) R(5+)
Dynamic Effects of Retirement on Income Satisfaction
1.5
1
0.5
0
-0.5
-1
-1.5
R(-4) R(-3) R(-2) R(-1) R(0) R(1) R(2) R(3) R(4) R(5+)
Dynamic Effects of Retirement on Leisure Satisfaction
4
3
2
1
0
-1
R(-4) R(-3) R(-2) R(-1) R(0) R(1) R(2) R(3) R(4) R(5+)

Appendix

Table A1: Fixed effect IV estimates of retirement anticipation and adaptation excluding respondents who have been always working

	Full Sample			
	(1)	(2)	(3)	(4)
	Overall	Health	Income	Leisure
Anti_3to4	-0.107	0.108	-0.293	0.413
	(0.306)	(0.349)	(0.368)	(0.400)
Anti_2to3	0.431*	0.521*	0.266	0.545*
	(0.246)	(0.286)	(0.291)	(0.315)
Anti_1to2	0.488**	0.674***	0.0956	0.762***
	(0.205)	(0.260)	(0.252)	(0.275)
Anti_0to1	0.455**	0.782***	0.500*	0.849***
	(0.204)	(0.254)	(0.261)	(0.272)
Adap_0to1	0.751***	0.521**	0.896***	2.117***
	(0.169)	(0.206)	(0.209)	(0.225)
Adap_1to2	0.766***	0.605**	0.206	2.206***
	(0.214)	(0.257)	(0.257)	(0.276)
Adap_2to3	0.484**	0.499*	0.0656	1.651***
	(0.245)	(0.289)	(0.288)	(0.318)
Adap_3to4	0.845***	0.623**	0.351	1.699***
	(0.256)	(0.303)	(0.294)	(0.331)
Adap_4to5	0.419	0.864***	0.322	2.000***
	(0.281)	(0.319)	(0.316)	(0.351)
Adap_more5	0.601***	0.893***	0.221	1.736***
	(0.230)	(0.272)	(0.268)	(0.304)
Observations	27068	27068	27068	27068

Note: ***<1%; **<5%; *<10%. Robust standard errors are in parentheses. The controls are age; age squared/100; real household income; number of own children living in the household; unemployment rate by region; and dummies indicating: gender, job status (whether the individual is unemployed, family care giver or disabled), educational attainment, health condition, ethnic group, marital status, locations and time.

Table A2: Fixed effect IV estimates of retirement anticipation and adaptation with higher-order age terms

	Full Sample			
	(1)	(2)	(3)	(4)
	Overall	Health	Income	Leisure
Anticipate 3-4 years	-0.0426	0.196	-0.00281	0.299
	(0.336)	(0.385)	(0.403)	(0.430)
Anticipate 2-3 years	0.489*	0.645**	0.606*	0.462
	(0.275)	(0.320)	(0.328)	(0.348)
Anticipate 1-2 years	0.549**	0.789***	0.421	0.655**
	(0.230)	(0.290)	(0.285)	(0.305)
Anticipate 1 year	0.551**	0.954***	0.902***	0.705**
	(0.246)	(0.302)	(0.311)	(0.322)
Adapt less than 1 year	0.892***	0.656**	1.308***	2.008***
	(0.225)	(0.274)	(0.279)	(0.295)
Adapt 1-2 years	0.869***	0.779**	0.642**	2.073***
	(0.260)	(0.308)	(0.313)	(0.331)
Adapt 2-3 years	0.573*	0.716**	0.565	1.415***
	(0.302)	(0.361)	(0.363)	(0.393)
Adapt 3-4 years	0.944***	0.843**	0.837**	1.467***
	(0.315)	(0.375)	(0.368)	(0.403)
Adapt 4-5 years	0.539	1.111***	0.884**	1.749***
	(0.358)	(0.413)	(0.411)	(0.447)
Adapt 5 years or more	0.756**	1.164***	0.752*	1.488***
	(0.328)	(0.392)	(0.392)	(0.428)
Age	-1.097	-1.295	1.883	0.167
	(1.807)	(2.131)	(2.110)	(2.339)
Age squared/100	2.714	3.736	-3.872	-1.116
	(4.652)	(5.473)	(5.413)	(6.018)
Age3/1000	-0.305	-0.459	0.336	0.179
	(0.525)	(0.616)	(0.609)	(0.679)
Age4/10000	0.0125	0.0202	-0.0101	-0.00995
	(0.0220)	(0.0257)	(0.0254)	(0.0284)
Observations	30294	30294	30294	30294

Note: ***<1%; **<5%; *<10%. Robust standard errors are in parentheses. The controls are real household income; number of own children living in the household; unemployment rate by region; and dummies indicating: gender, job status (whether the individual is unemployed, family care giver or disabled), educational attainment, health condition, ethnic group, marital status, locations and time.

Table A3: Fixed effect IV estimates of retirement anticipation and adaptation excluding respondents more than 80 years old

	Full Sample			
	(1)	(2)	(3)	(4)
	Overall	Health	Income	Leisure
Anticipate 3-4 years	-0.0285	0.117	-0.315	0.500
	(0.317)	(0.360)	(0.377)	(0.413)
Anticipate 2-3 years	0.492*	0.542*	0.277	0.689**
	(0.254)	(0.292)	(0.299)	(0.326)
Anticipate 1-2 years	0.543***	0.675**	0.0907	0.890***
	(0.209)	(0.265)	(0.256)	(0.282)
Anticipate 1 year	0.543**	0.812***	0.503*	0.996***
	(0.211)	(0.260)	(0.266)	(0.281)
Adapt less than 1 year	0.883***	0.522**	0.936***	2.281***
	(0.183)	(0.223)	(0.224)	(0.245)
Adapt 1-2 years	0.847***	0.615**	0.239	2.382***
	(0.219)	(0.260)	(0.261)	(0.284)
Adapt 2-3 years	0.541**	0.514*	0.0866	1.790***
	(0.251)	(0.295)	(0.294)	(0.328)
Adapt 3-4 years	0.911***	0.639**	0.376	1.840***
	(0.264)	(0.310)	(0.301)	(0.342)
Adapt 4-5 years	0.493*	0.868***	0.353	2.174***
	(0.287)	(0.324)	(0.321)	(0.360)
Adapt 5 years or more	0.677***	0.899***	0.269	1.927***
	(0.244)	(0.286)	(0.282)	(0.324)
Observations	30279	30279	30279	30279

Note: ***<1%; **<5%; *<10%. Robust standard errors are in parentheses. The controls are age; age squared/100; real household income; number of own children living in the household; unemployment rate by region; and dummies indicating: gender, job status (whether the individual is unemployed, family care giver or disabled), educational attainment, health condition, ethnic group, marital status, locations and time.